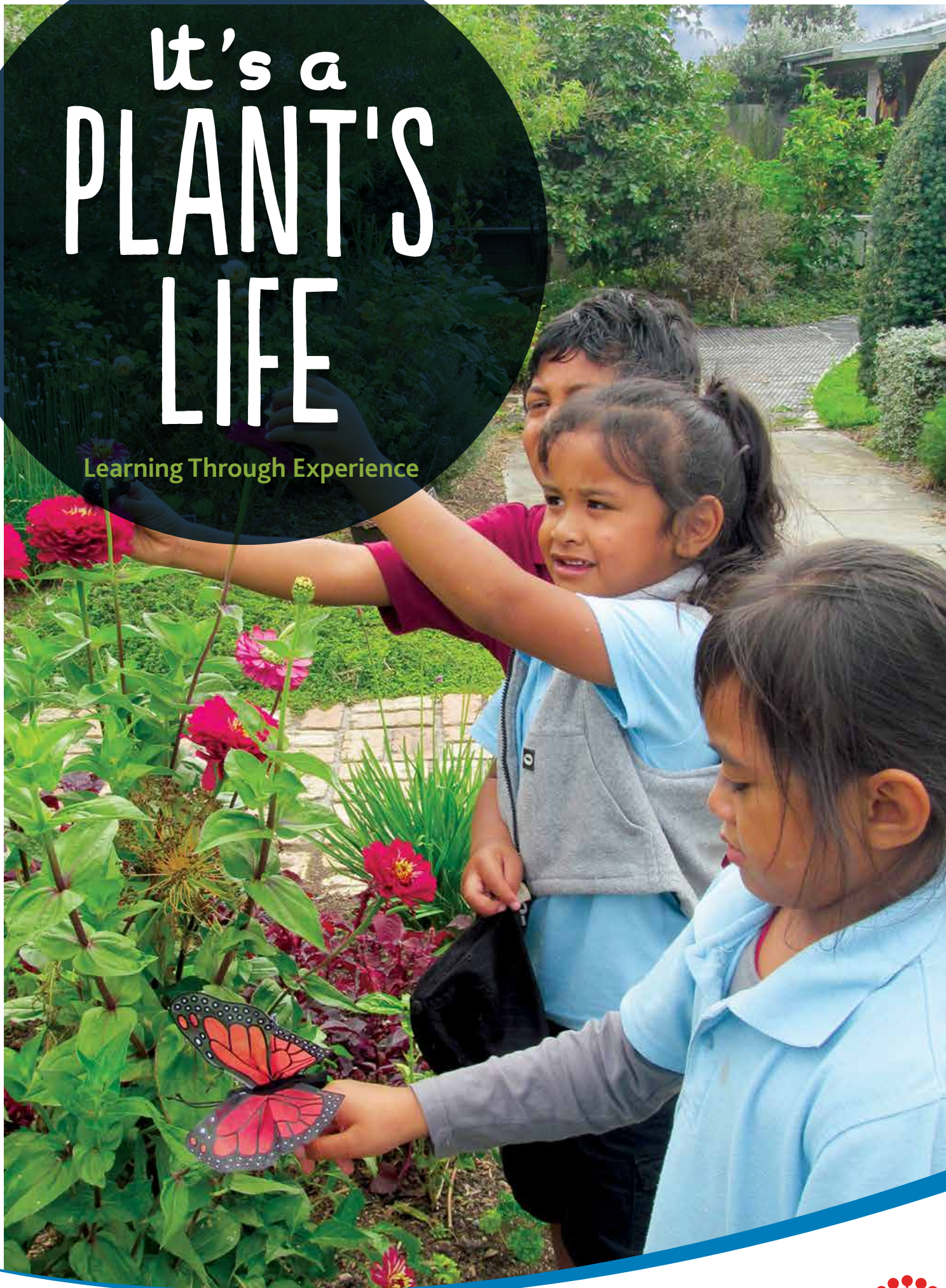


# It's a PLANT'S LIFE

Learning Through Experience



BC5467

**Auckland  
Council**

Te Kaunihera o Tāmaki Makaurau





A photograph of a field of pink cosmos flowers with yellow centers, growing on tall green stems. The background is a soft-focus landscape with more flowers and a clear sky.

# ABOUT THIS RESOURCE

This resource is designed to support Learning Through Experience (LTE) education programmes. It contains curriculum links and ideas for teaching and learning designed to motivate and engage students.

LTE programmes are provided by Auckland Council's Education for Sustainability team. The LTE programmes are delivered in the rich and diverse environments of Auckland's regional parks, by experienced teachers and park rangers. LTE provides students with experiential learning activities in the environment.

Auckland Council provides more than 50 LTE programmes that enable students to learn in, about and for their environment. A range of other Education for Sustainability programmes and services, including professional development opportunities for teachers, is also provided.

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*Visit us online and discover how Auckland Council supports young people in creating a sustainable future for Auckland.*

[aucklandcouncil.govt.nz/educationforsustainability](https://aucklandcouncil.govt.nz/educationforsustainability)

## Acknowledgements

Authors: Auckland Council Education for Sustainability team

Updated: 2016

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# It's a PLANT'S LIFE

## Big ideas

-  Plant parts and their functions
-  Lifecycle of flowering plants
-  Germination
-  Pollination
-  Seed formation
-  Seed dispersal

## LEARNING THROUGH EXPLORING THE ENVIRONMENT

LTE programmes provide information and experience as a basis for further inquiry. Exploration of your local environment provides opportunities for students to make observations of the variety of plants, conditions needed for their growth and the different stages in the life cycle of plants. Essential skills of observing, classifying, predicting, inferring and hypothesising can develop as time is spent investigating and exploring. Questions can be asked, reframed and extended as students become familiar with concepts to their inquiry.

### TAKING CARE OUT THERE

It is vital students are aware of the need to explore the environment carefully. To treat it with care and respect, that is try not to damage or destroy it in anyway. This message should be reiterated and reinforced throughout their inquiry.





## Links to the New Zealand Curriculum

### Vision

#### Our vision is for students to be

<b>Connected</b>	To the land and environment
<b>Actively involved</b>	Participants in a range of life contexts
<b>Lifelong learners</b>	Critical and creative thinkers Active seekers, users and creators of knowledge Informed decision makers

### Principles

#### Encourage students to look to the future by

<b>Future focus</b>	Exploring how plants support the environment and community
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### Values

#### Students will be encouraged to value

<b>Innovation, inquiry and curiosity</b>	Think critically, creatively and reflectively
<b>Community and participation</b>	For the common good
<b>Ecological sustainability</b>	Which includes care for the environment

### Key competencies

#### Students are given opportunities to become competent at

<b>Thinking</b>	Developing critical, creative and caring thinking about plants Drawing on personal knowledge to make informed Reflecting and evaluating
<b>Using language, symbols and text</b>	Using language related to plants
<b>Participating and contributing</b>	Contributing to the quality and sustainability of the environment

### Achievement objectives

#### Science – Nature of Science

<b>Investigating in science</b>	<b>Level 1 &amp; 2:</b> Extend their experiences and personal explanations about the natural world through exploration, play, asking questions and discussing simple models <b>Level 3 &amp; 4:</b> Build on prior experiences, working together to share and examine their own and others' knowledge. Ask questions, find evidence, and carry out appropriate investigations to develop simple explanations.
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#### Science – Living World

<b>Life processes</b>	<b>Level 1 &amp; 2:</b> Recognise that all living things have certain requirements <b>Level 3 &amp; 4:</b> Recognise that there are life processes common to all living things and that these occur in different ways
<b>Ecology</b>	<b>Level 1 &amp; 2:</b> Recognise that living things are suited to their particular habitat <b>Level 3 &amp; 4:</b> Explain how living things are suited to their particular habitat and how they respond to environmental changes, both natural and human-induced.



IT'S A PLANT'S LIFE

# BACKGROUND INFORMATION

Seeds can only be produced once the ovules (female cells) have been fertilized by pollen (male cells). When a pollen grain lands on the stigma it produces a pollen tube which grows down the style to the ovary. Each fertilized ovule then develops into a seed and the ovary ripens to become fruit. Botanically, the word fruit refers to all seed-containing structures, not just the juicy edible ones. Hence a pumpkin, pea pod, tomato are fruits.

Seeds occur in fruits which may be fleshy, woody or pod-like. Each seed contains everything it needs for a new plant to grow - an embryo which will form the first shoot and root, a food supply for the emerging plant, and a protective seed coat.

Seeds remain inactive until conditions such as water, oxygen and temperature are right for germination. The amount of light required for germination differs between plant species. Water and oxygen are absorbed through the seed coat causing the embryo inside to swell and break the seed coat. The first roots (called the radical) emerge from the seed, followed by the shoot, containing the stem and leaves. Once the shoot emerges into the light the plant begins to make its own food via photosynthesis.

Photosynthesis is a plant process that converts light energy into chemical energy in the form of sugars and other organic compounds. This process requires light, CO<sub>2</sub> and H<sub>2</sub>O. Photosynthesis occurs primarily by chlorophyll located in the chloroplasts within the leaves. Chlorophyll appears green because it absorbs blue and red light, whereas green is reflected back and can be seen by our eyes.












# TEACHING and LEARNING SUGGESTIONS



# GETTING STARTED

## Gathering before views









### Suggested plant and lifecycle concepts for discussion

-  **Classification:** Discuss "What is a plant?" "What does a plant have?"
-  **Plant parts and function:** Students draw and label a plant. These could be compared with drawings made at the end of the study for assessment
-  **Identification and biodiversity:** Go on a walk to locate different types of plants. Observe differences between their flowers, leaves, seeds, fruit, growth form, bark etc. Record ideas about how the plants are different / the same
-  **Germination:** Observe a seed and seedling of the same plant. Discuss the seeds requirements for germination and changes that happened
-  **Photosynthesis:** Discuss "Where do plants get their energy from?"
-  **Flowers and pollination:** Observe flowers at different stages of growth including buds, flower opening, petals falling etc. Discuss "Why does a plant have flowers?"
-  **Fruit and seeds:** Cut open a range of fruits (including non-edible fruits) to observe seeds developing inside
-  **Seed dispersal:** Observe a plant in seed and discuss how the seed will travel to a place to germinate. How does the seed shape / size / taste help it to travel?
-  **Interdependence:** Predict what sorts of animals rely on plants for survival.



# SCIENCE INVESTIGATIONS

## Simple science ideas









-  Examine a bean seed. Soak it in water for 24 hours. Students predict what they think they will see happen. Remove the seed coat after 24 hours and open the seed coating to reveal the embryo. Record ideas
-  Label seed parts (seed coat, stored food, the shoot, the root)
-  Grow a variety of vegetables and flowers to learn about the needs of plants and/or observe the changes which occur
-  Observe insects visiting flowers to see if different insects have colour preferences of flowers or how many flowers bees visit in a given time
-  Identify the special features of flowers that help them attract pollinators. Sort the flowers into groups related to how they are pollinated, those with veining for insect guide lines, mimicking insect shape, long funnel shapes that insects have to creep down or birds probe into, etc
-  Compare the differences between ferns, mosses, and flowering plants
-  Test dispersal method of a range of seeds by floating in water, blowing with a fan, or scoring it for tastiness
-  Research seed banks and why they are necessary.










# CURRICULUM ACTIVITIES

## Art

-  Press leaves and flowers to make pictures
-  Pencil sketches of flower parts - stamens, veins, calyx
-  Paint terra-cotta pots. Use tempera or acrylic paint and varnish
-  Complete still life arrangements
-  Design wrapping/wall paper using flower patterns
-  Use a range of seeds (pulses) to create designs
-  Study flower fairy paintings and create your own pictures
-  Visit a park or garden and look at the effects of complementary and opposing colours in the plantings. Use the opportunity to make coloured paintings of a mass of flowers in a pointillism style.









## Maths

-  Measure the growth of plants with conventional or non-conventional tools
-  Sort shapes of seeds or petals
-  Make a tessellating pattern with seed, flower or leaf designs
-  Record insects visiting a flower over a given period of time
-  Complete graphs of most common colour or types of flower in gardens at school or at home.










# CURRICULUM ACTIVITIES



## English

-  Make up a crossword, with clues and a grid using key plant words
-  Explain how to grow plants from seed using diagrams and short sentences
-  Poetry - shape poem, cinquain, acrostic, hiku, or free-shape
-  A description of a garden or a flower
-  A newspaper article about a unique plant or garden area
-  Describe what needs to happen to change one pea into lots of peas
-  Design an advertisement to invite bees, butterflies and birds to visit a flower
-  Make a list of all the plants we eat. Then divide them into ones which are a seed, leaf, flower or stem.

## Technology/Design

-  A flower to attract bees
-  A seed disposal capsule
-  And make environmentally friendly identification tags for gardens
-  A gardening tool that can dig, rake and make holes in the ground
-  An insect or bird to pollinate a plant
-  A way of keeping the rain and wind off your prize flowers
-  A way of keeping slugs and snails away from plants using recycled materials.

### YOU COULD ALSO TRY THESE

-  Mime the growth stages of plants
-  Have a flower show.... students to design the programme and invitation.



# Student ACTIVITIES



# PLANT SCAVENGER HUNT

Find someone who...

Has a vegetable garden at home

Eats root vegetables

Can name an insect that eats from flowers



Has climbed a tree

Can name a seed people eat

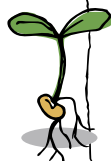
Can name two things plants need to grow



Can name a plant they eat the leaves of

Has planted a seed

Knows the name of the colourful part of a flower



Knows the name of the green part of a plant

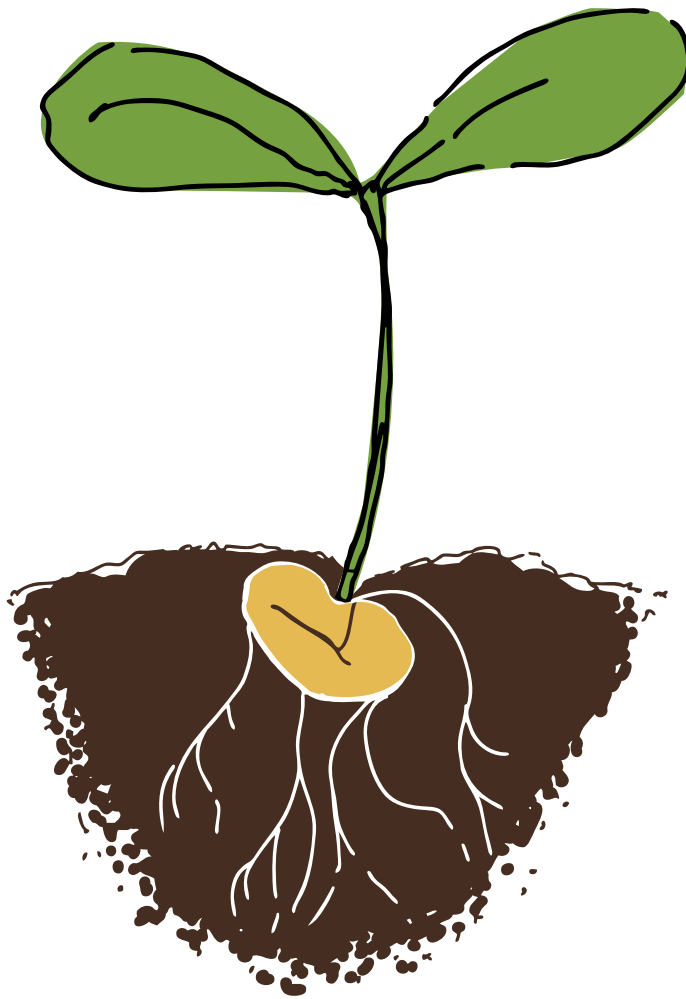
Can name three fruits with seeds inside

Has been in a forest



# PLANT NEEDS

Draw pictures and label all of the things this plant needs to help it grow.



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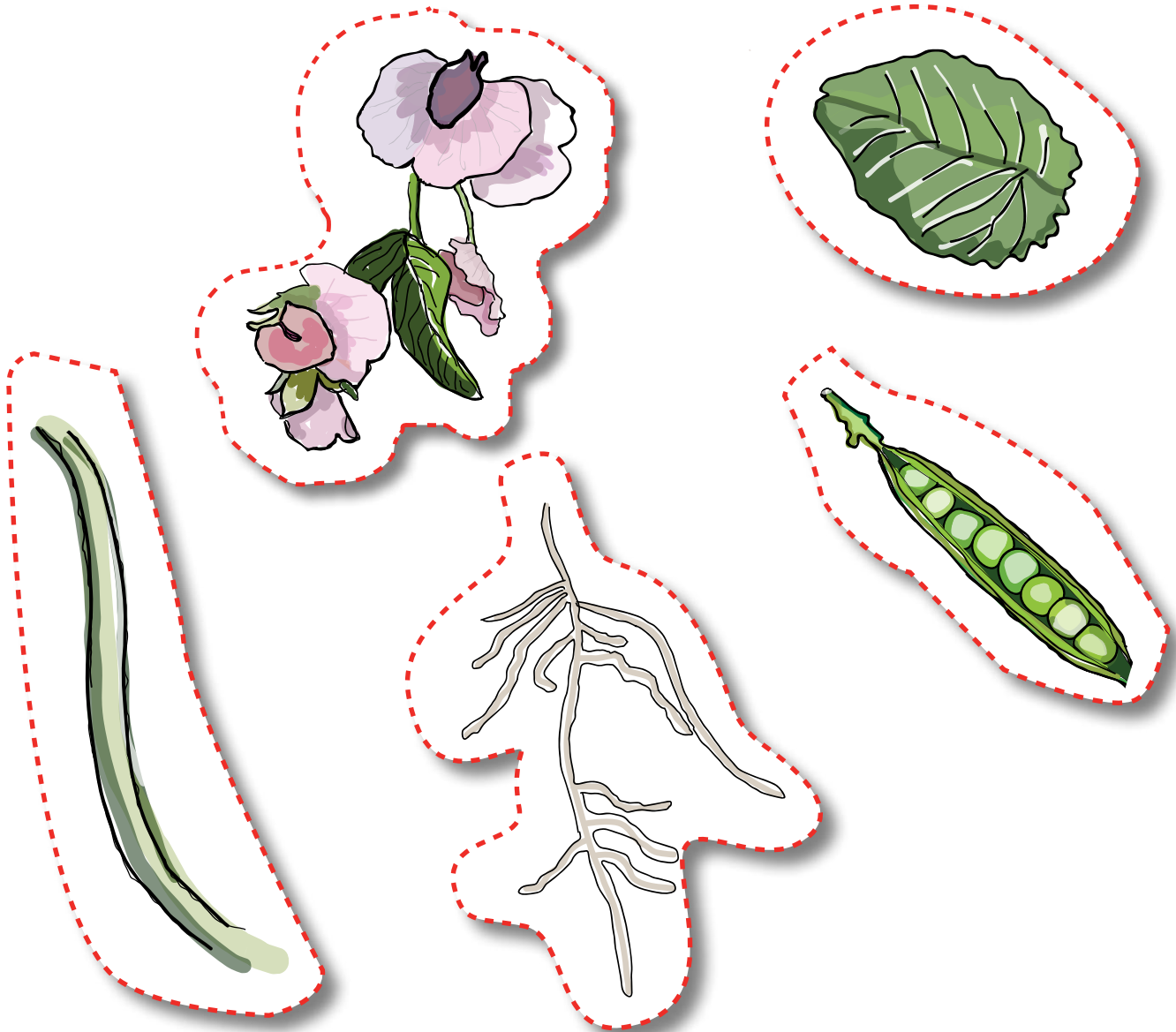
IT'S A PLANT'S LIFE

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# PLANT PUZZLE

Cut out and arrange the pictures to make a plant.



Now cut and paste these words correctly onto your plant picture.

root

stem

flower

leaf

fruit



# WE EAT PLANTS

Cut and paste the food pictures to the correct box.

seeds

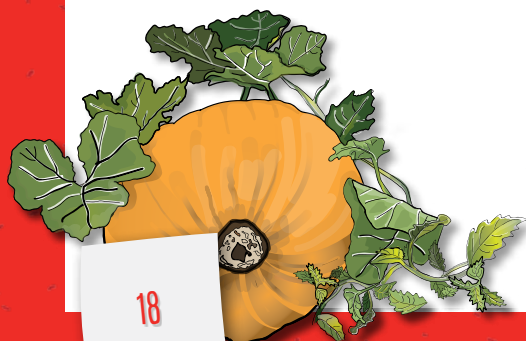
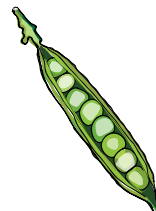
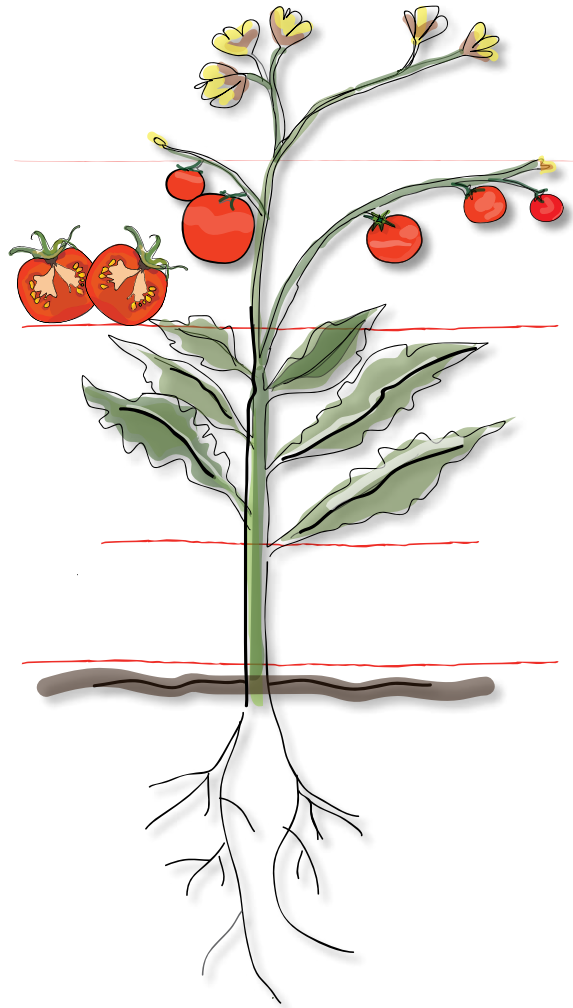
flowers

fruit

leaves

stems

roots

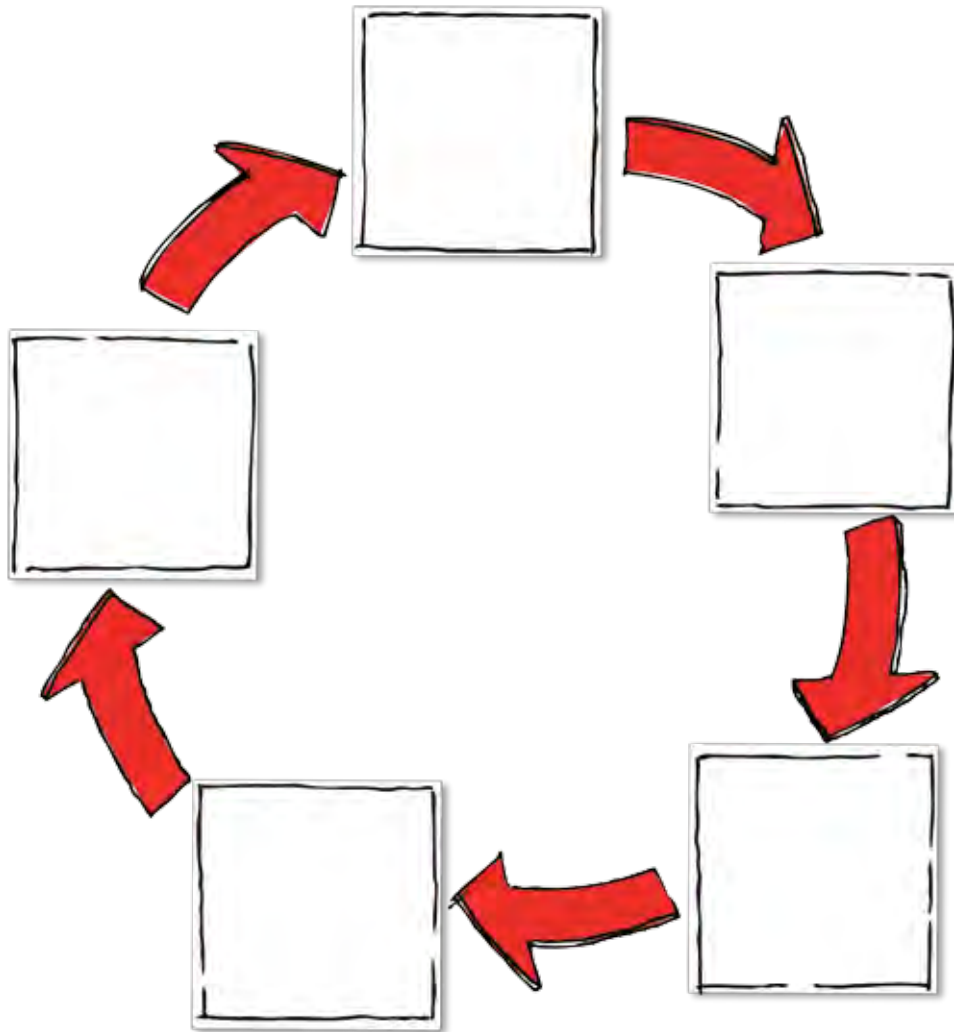


IT'S A PLANT'S LIFE

# THE LIFE CYCLE OF A PLANT

Cut out and arrange the pictures in the correct order.

Copy these labels next to the correct picture: **flower**, **tree**, **seedling**, **seed**, **fruit**.

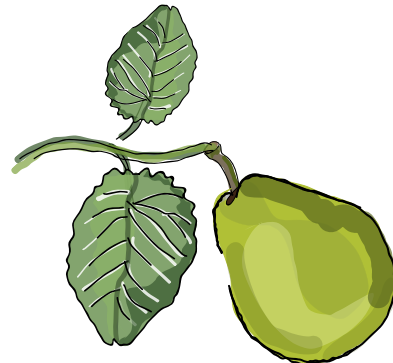


# FLOWERS TO FRUIT

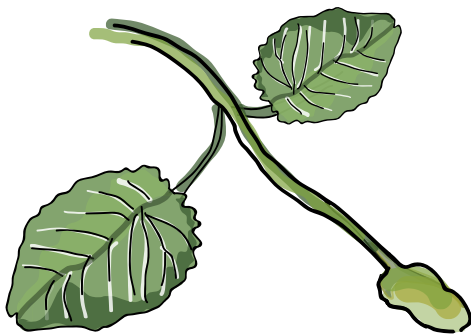
Cut out and arrange the pictures in the correct order to see the flower change into a pear.



The flower opens. Bees visit to collect nectar. Pollen sticks to their bodies and is carried from flower to flower.



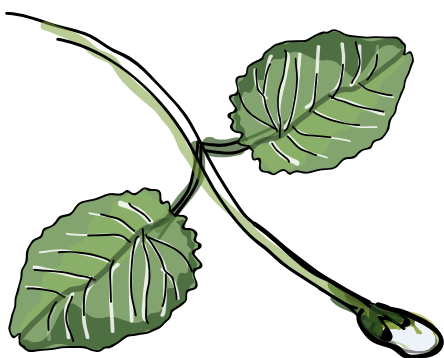
The pear is ripe and ready to eat. It has seeds inside that may grow into new pear trees.



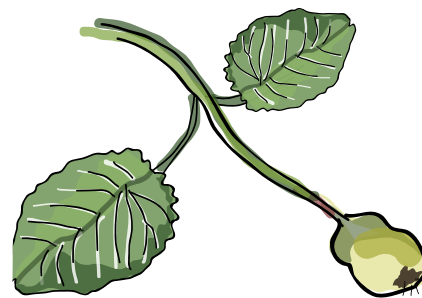
The pear fruit is growing. It is green and unripe.



The flower dies and the petals begin to fall. A little pear begins to grow.



Here is a bud of a pear flower.



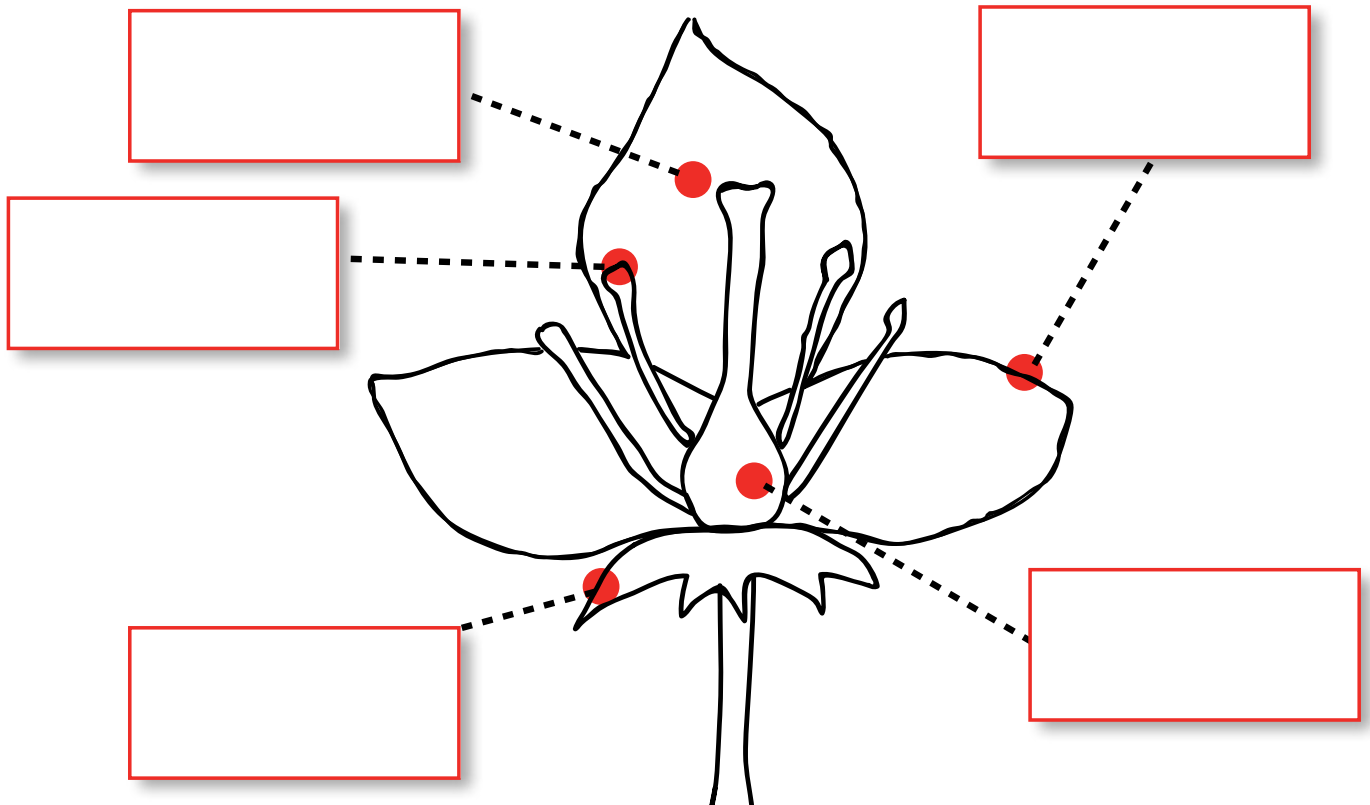
All the petals have fallen. The pear continues to grow.



IT'S A PLANT'S LIFE

# FLOWER PARTS

Label the parts of the flower - petal, ovary, anther, stigma, calyx



Match the part of the flower with its correct function.

petal

sticky to collect pollen

stigma

encloses the bud

anther

where the seeds grow

ovary

brightly coloured to attract insects

calyx

where the pollen is made



# I SAY, I SAY WHAT HAVE WE GOT HERE

Early explorers, scientists and botanists didn't have cameras to record their findings so they carefully wrote and made detailed drawings of their discoveries. They noted every tiny feature about the plant or animal and the environment where it was found.

## Instructions

Imagine you are a botanist searching an unexplored area of the school grounds. You come across a plant no-one else has spotted before.

You say... **"I say, I say, what have we got here?"**

### Carefully sketch and describe every detail of the plant



What time of day did you find it? What was the weather like?



How did you come across this 'mysterious' plant?



What colour are the flowers?



How does it feel?



Does it have a smell?



How big? How small?



What else is growing nearby?



### Give it a name. Yes, go on, make one up!

When you've finished give your description to someone else and ask them to locate the plant.



### DO YOU KNOW WHAT A BOTANIST IS?

A botanist is a scientist who focuses on 'botany', or plant life. They study how plants are structured, how they grow and reproduce, and diseases known to plants. Humans started studying plants thousands of years ago when people needed to learn if plants were edible, poisonous, or had medicinal use.



# PLANT POLLINATORS

Read the clues to find out who and what pollinate plants.



I am yellow and black, but can also be brown  
I fly between lots of flowers  
I collect pollen  
I have special collecting bags on my legs  
**I am a b\_\_**



I have wings  
I start my life as an egg  
I become a caterpillar and then a chrysalis  
I feed on nectar  
**I am a b\_\_\_\_\_**



Sometimes I make a loud noise  
You can feel me but can't see me  
You can sometimes see the things I do  
I move the branches of trees and carry the pollen away  
**I am the w\_\_\_**



I can fly  
I have a long beak and tongue  
I love nectar  
I have feathers  
**I am a b\_\_\_\_**



I don't have feathers but I can fly  
Some people are scared of me  
but there is no need to be  
I am a native New Zealand mammal  
I come out at night  
I feed on pollen and nectar  
**I am a b\_\_**



# TRAVELLING SEEDS

## Instructions

Draw arrows to show the different ways seeds can travel. You can use words more than once. One has been done for you.

Things a seed can be or have	Things that can happen to a seed	Things that can help this to happen
spikes / hooks	float	wind
hairs	stick	water
<b>light</b>	shake	animals
tiny	eaten	<b>drying out</b>
wings	fly	
juicy covering	<b>pod explosion</b>	
sticky coat		
waterproof		

Write next to each seed how they will travel




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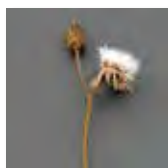
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# DISPERSING SEEDS

Plants need sunshine, water, and space to grow. New seeds need a way to disperse from the adult plant to a place where they can get these things to grow.

## How do seeds disperse? They can...

-  float away
-  be carried away by animals
-  have hooks and stick to things
-  be blown away by the wind
-  fly away with specially developed parts
-  have a seed pod that bursts open and shoots the seeds away.

## Instructions

-  Design a seed that can stick to an animal. Use plasticine / clay / scraps to make your seed  
OR
-  Design a seed that can fly away. Conduct experiments to see which seed flies best
-  Make an advertisement listing the seeds special features. Share the advertisement with a friend to see if they can tell which seed is yours from your description.

## STUCK FOR IDEAS?

Cut about six pieces of paper 10 cm by 40 cm. Use scissors and a paper clip to cut, fold and weigh your paper to make the best flyer. The paper clip represents the seed.

## SMART TIP

Research to find real examples of how seeds fly and stick to things.



# PLANT SURVIVAL

A plant gets everything it needs for survival from its habitat.

## Instructions

Name and describe four things plants need to survive and how they get these in this forest habitat.

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2

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3

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4

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# PLANT ADAPTATIONS

Even in harsh environments plants must get all their needs met to be able to survive.

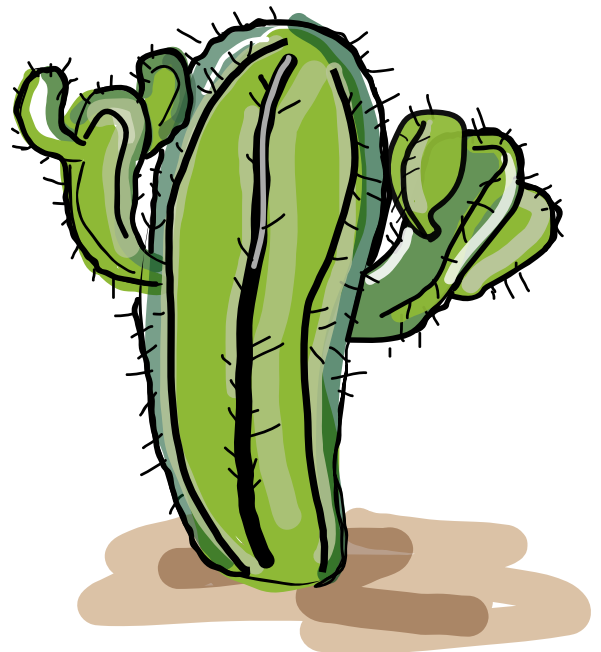
## Instructions

Describe how each adaptation helps the cactus to collect and store water... even in a hot, dry desert.

Spikes






Wide stem

Grooves








# INVESTIGATORS WANTED HERE

Find out about one or more of these topics

-  Reproduction of plants
-  How seeds spread
-  How plants get their energy
-  Carnivorous plants
-  The movement of water or food inside plants.

You will need to plan your investigation. You may need to turn the topic into a question

-  The question or topic
-  Other questions I need to ask for the investigation or key words I need to consider
-  What I plan to do during the investigation
-  Equipment or resources I will use
-  How I plan to share my investigation.

## HELPFUL HINT

You might want to use the **Work Plan** sheets, which are available from your teacher.



Kereru poo



# IT'S TIME FOR ACTION

By now you should realise how important plants are



They provide homes and habitats



They give us (and lots of other animals) food



They give out oxygen and take in carbon dioxide



They make our environment far more beautiful and comfortable to live in!

So it's our turn to help plants

## Things to do to help plants



Make a commitment never to damage plants or break off flower heads just for fun



Look after a patch of garden and / or create a new one at home



Be a plant advocate and spread the message of how useful plants are.

## At school



Make your school a nicer place to be by growing flowers



Plant trees for food or forests



Look after and care for a garden.



Grow seeds to sell at a community plant sale.

## In your local community



Ask your community for ideas to improve the local environment with plants



Help older people with their gardening



Petition the council to plant more gardens, trees, or plants by streams



Hold a Garden Competition for the best garden. Get local businesses to sponsor prizes and to take part in the competition themselves.

**Aim at creating a community you are proud to live in!**



# Teacher RESOURCES



# MY WORK PLAN

Name: \_\_\_\_\_

Date work started: \_\_\_\_\_ Date work finished: \_\_\_\_\_

Inquiry: \_\_\_\_\_

My investigation will be about: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

My main question is: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Other questions I need to ask are: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Some key words I need to think about are: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Things I will do to find the answer: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

I can get information and help from: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



# MY WORK PLAN

I am going to share my work in the following ways: \_\_\_\_\_

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Other ideas: \_\_\_\_\_

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## Work plan seen by:

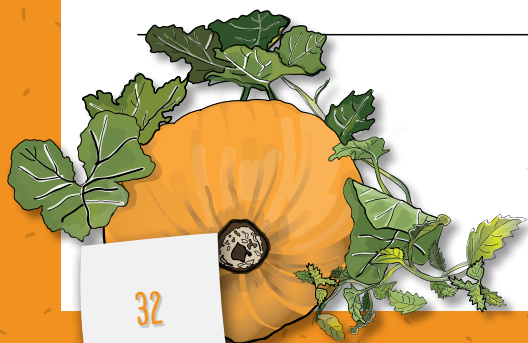
Student: \_\_\_\_\_ Teacher: \_\_\_\_\_

Comments: \_\_\_\_\_

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# MY LEARNING SUMMARY

Name: \_\_\_\_\_

Date work finished: \_\_\_\_\_

Main theme/inquiry: \_\_\_\_\_

**The most interesting fact I learned was:**

**I would like to find out more about:**

**Three new words and their meanings I have learned are:**

**Word:**

**Word:**

**Word:**

**Meaning:**

**Meaning:**

**Meaning:**

**Some of the resources I used:**



# MY SELF-EVALUATION SHEET

Name: \_\_\_\_\_

Date work finished: \_\_\_\_\_

Main theme/inquiry: \_\_\_\_\_

The main things I did were:

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The main things I learnt were:

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The things I still need help with are:

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The best thing I learnt or did was:

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Next time I would like to:

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# MY SELF-ASSESSMENT

Name: \_\_\_\_\_

Date work finished: \_\_\_\_\_

Main theme/inquiry: \_\_\_\_\_

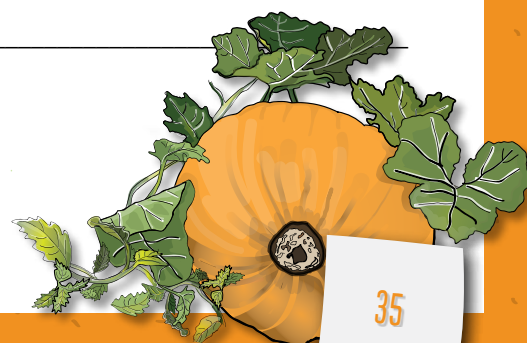
	Place a cross on the continuum below
	Not so well  Really well
	Not so well  Really well
	Not so well  Really well
	Not so well  Really well
	Not so well  Really well
	Not so well  Really well
	Not so well  Really well
	Not so well  Really well
	Not so well  Really well

Three things I could do better:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

Three things I am proud of:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_





Find out more: phone 09 301 0101  
or visit [aucklandcouncil.govt.nz/educationforsustainability](http://aucklandcouncil.govt.nz/educationforsustainability)